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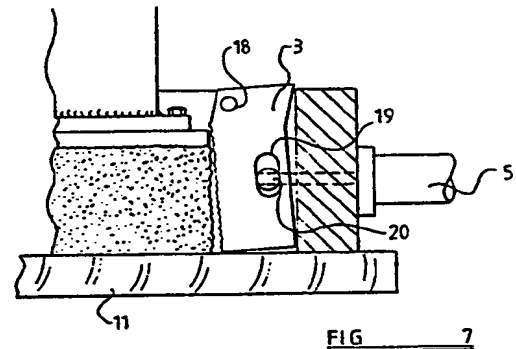
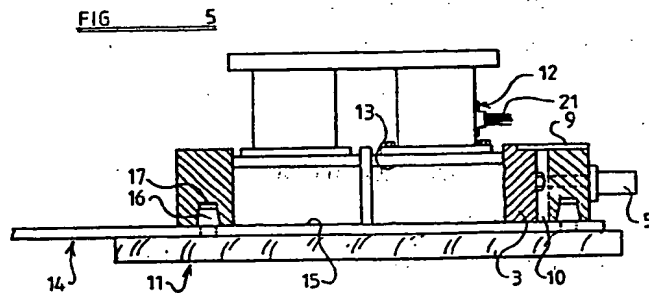
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 INT CL⁶ **B28B**

(54) **Moulding a textured or three dimensional surface onto a concrete block**

(57) The mould has one or more block moulding cavities, at least some of which incorporate a movable element (3) having a textured surface, forming one face of the mould cavity. The element is linearly or pivotally movable by a means (5) between a first advanced position in which the textured surface engages material to be moulded by compaction or compression in the cavity, and a second retracted position in which the textured element surface is disengaged from the moulded material, enabling block removal without damage of the textured surface. A cover (9) may be provided to prevent ingress of moulding material to the space (10) in which the element moves. Other mould cavity surfaces (13, 15) may be textured. The mould part defining the cavity walls may be raised to effect release from the moulded blocks, and simultaneously effect cleaning of the textured element surface, by a brush (21) carried by a moulding plunger.



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FIG 1

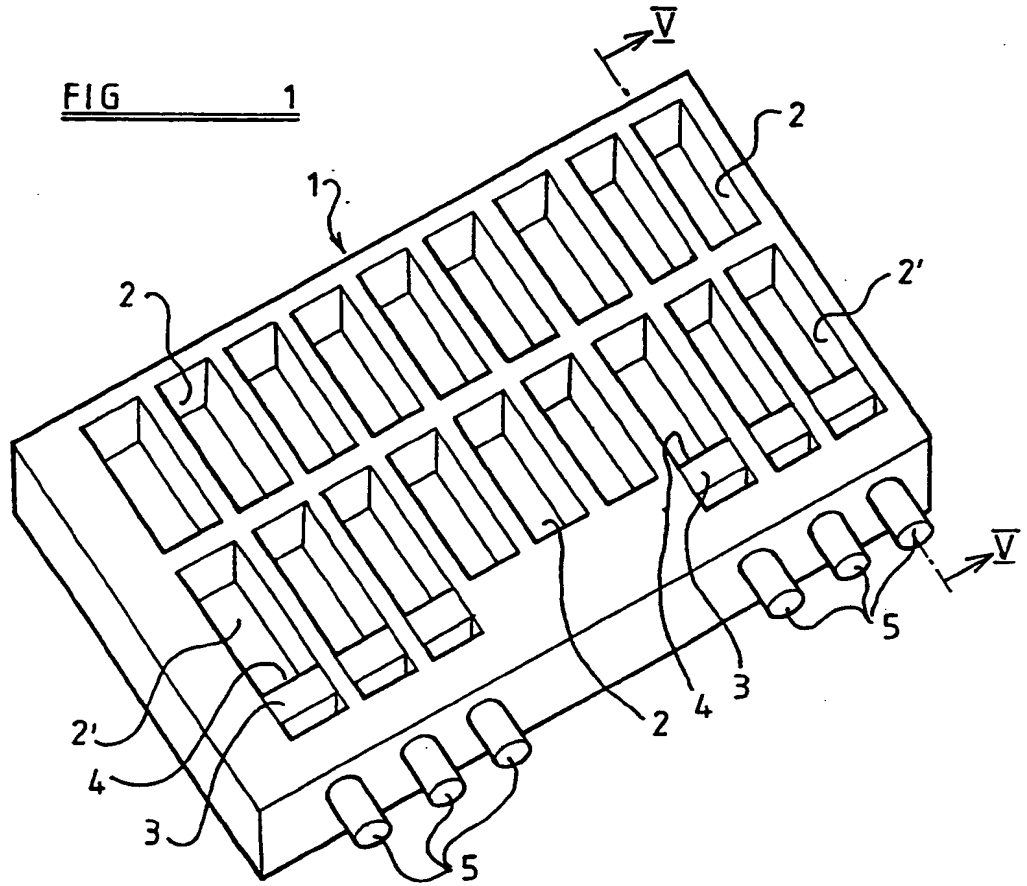
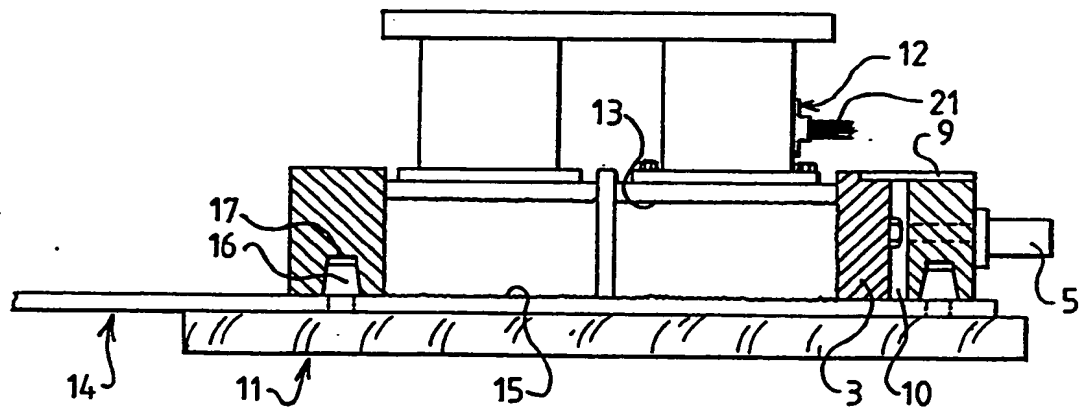


FIG 5



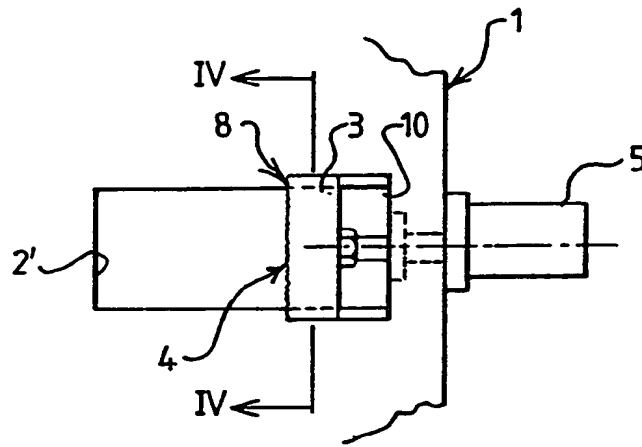


FIG 2

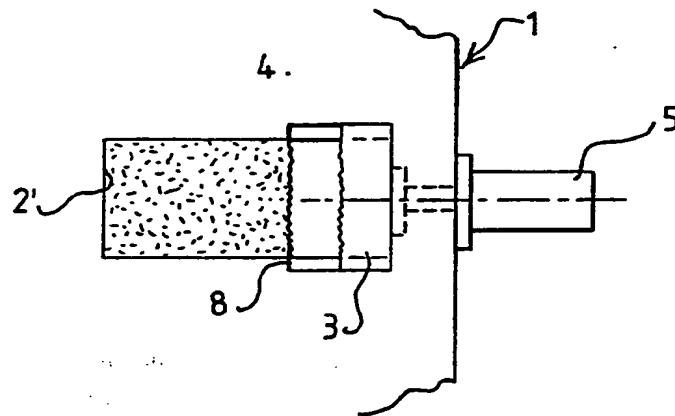


FIG 3

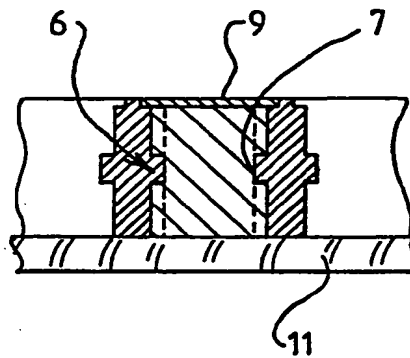


FIG 4

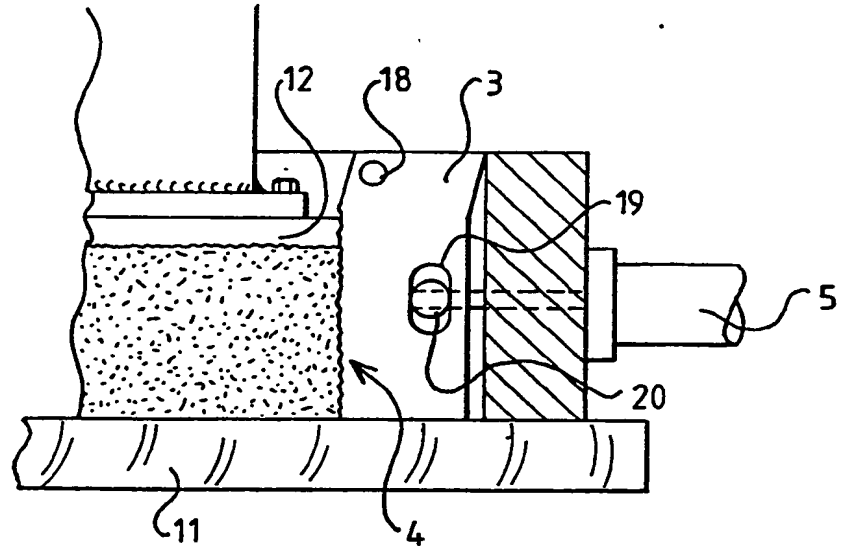


FIG 6

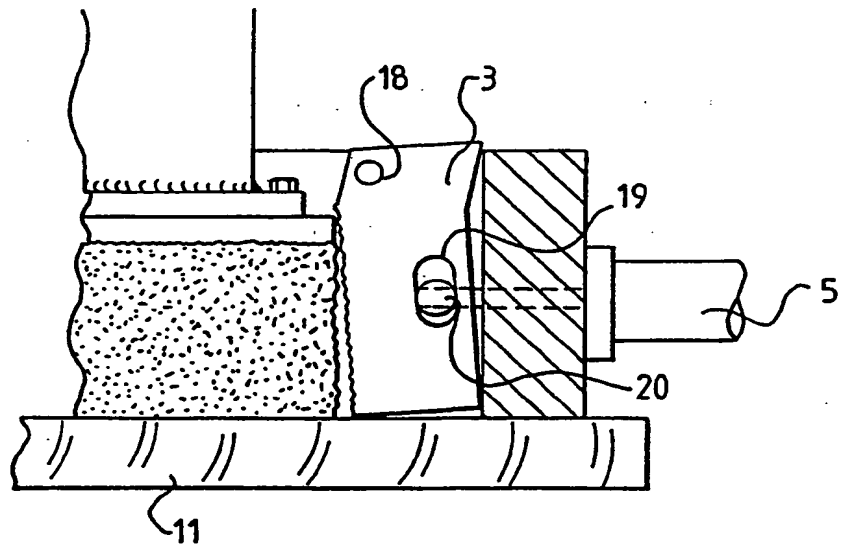


FIG 7

PATENTS ACT 1977
P5889GB-NF/SJW/jsd

DESCRIPTION OF INVENTION

Improvements in or relating to a mould

THE PRESENT INVENTION relates to a mould such as is used in a vibrating block machine, a mechanical or hydraulic press or a tamper press for producing blocks or bricks of concrete or calcium silicate. More particularly this invention is concerned with a mould for producing a block or brick where some of the faces of the block are to be provided with a textured or three-dimensional surface finish. The finish may be imprinted or embossed and may be either decorative or functional.

The present invention seeks to provide a mould for use in forming bricks or blocks having a textured or three-dimensional surface finish on at least two faces of the block, although the present invention may also be utilised in forming a block having only a single textured face.

According to the present invention there is provided a mould for use in forming a concrete block or the like, the mould defining one or more mould cavities for receiving material from which the or each block is to be formed, at least some of the mould cavities incorporating a movable element having a textured or three-dimensional surface, said textured or three-dimensional surface forming one face of the mould cavity, the element being mounted in the mould cavity for move-

ment between a first position in which said textured surface engages material introduced into the cavity to form a textured surface in the material and a second position in which, once the material has been compacted or compressed, the textured surface of the element is disengaged from the material forming the block thereby enabling removal of the block from the mould cavity without damaging the textured surface of the block, means being provided for moving the movable element between said first and second positions.

Preferably the mould defines a plurality of mould cavities.

Conveniently the or each cavity comprises an aperture extending through the mould, the aperture being generally rectangular in plan view.

Advantageously the textured or three-dimensional surface of the movable element forms a face along a shorter side of the mould cavity.

Preferably said means for moving the movable element comprise a hydraulic cylinder connected to the element.

Alternatively the moving means may comprise mechanical, pneumatic or electrical means.

In one embodiment the movable element is mounted for linear movement between the first and second positions within the mould cavity.

Preferably co-operating projections and recesses are provided on the movable element and the sides of the mould cavity to guide the movement of the element.

Conveniently the mould cavity defines a stop to limit movement of the movable element.

Advantageously the movable element is provided with a cover which extends over a space between the element and one end of the mould cavity adjacent which the element is mounted, the cover preventing the ingress of material into that space.

In a second embodiment the movable element is mounted for pivotal movement between the first and second positions within the mould cavity.

Preferably the element is pivotally mounted on a hinge pin disposed adjacent the upper edge of the element.

Conveniently the upper region of the movable element is so formed as to engage one end of the mould cavity adjacent which it is mounted when in the first position thereby preventing the ingress of material into the space between the remainder of the element and the end of the mould cavity.

This invention also provides a brick or block forming machine incorporating a mould in accordance with any one of the preceding Claims.

In order that the present invention may be more readily understood and so that further features thereof may be appreciated, the invention will now be described by way of example with reference to the accompanying drawings in which:

FIGURE 1 is a schematic, perspective view of a mould in accordance with the present invention;

FIGURE 2 is a plan view of a single mould cavity with a movable element of the cavity shown in a first position;

FIGURE 3 is a view corresponding to Figure 2 but showing the movable element in a second position;

FIGURE 4 is a vertical cross-section taken on the line IV-IV of Figure 2;

FIGURE 5 is a cross-sectional view taken on the line V-V of Figure 1;

FIGURE 6 is an enlarged view of part of an alternative design of mould cavity showing a movable element of the cavity in a first position; and

FIGURE 7 corresponds to Figure 6 but illustrates the movable element of the mould cavity in a second position.

Referring initially to Figure 1 of the drawings a mould 1 defines a plurality of mould cavities 2, each of which has the form of a rectangular aperture extending through the mould. The dimensions and shape of the cavities 2 may, of course, vary depending upon the size and shape of brick or block to be formed. When the mould is placed upon an appropriate support surface the cavities 2 may receive material such as concrete or calcium silicate in semi-dry form (i.e. where it is damp but will not 'slump') which is then compressed or compacted to form bricks or blocks which are self-supporting. The bricks or blocks are subsequently removed from the mould and cured or allowed to set.

The mould shown in Figure 1 of the drawings defines a total of eighteen cavities, the majority of

which simply comprise a rectangular aperture as indicated above. However, six cavities 2' are of greater length than the remaining cavities, with the extended portion of the aperture receiving a movable element 3. The element 3 constitutes a wall at one end of the aperture with the inwardly directed surface 4 of the element forming one surface of the rectangular aperture. The surface 4 of the movable element 3 is textured, i.e. it is not planar but carries a three-dimensional pattern to be applied to one face of the brick or block to be formed in the associated cavity.

Each element 3 is movable between a first, brick-forming position in which the textured surface 4 engages material received in its associated cavity to form the desired surface finish on the brick and a second position in which it is disengaged from the material of the brick so as to enable the brick to be removed from the cavity without destroying the textured surface formed by the engagement of the element with the brick. The element 3 is, of course, only moved to the second position once the material from which the brick is formed has been compacted or compressed.

Two alternative embodiments of movable elements 3 are envisaged, as will be described below. The elements 3 illustrated in the accompanying drawings are each attached to a hydraulic cylinder 5 which effects movement of the element between the first and second positions. However, any appropriate means, being mechanical, hydraulic, pneumatic or electrical may be used to move the elements, either individually or together.

Figures 2 to 4 illustrate one embodiment of the movable element 3 where the element is mounted for linear movement within the cavity 2' of the mould. Figure 2 illustrates the element 3 in the first or

brick-forming position, whilst Figure 3 shows the element in the second, disengaged position.

As shown in Figure 4 of the drawings tenon guides 6 are formed in the opposite sides of the extended part of the mould cavity, the tenon guides 6 being received in co-operating mortices 7 formed in the movable element 3 so as to guide horizontal movement of the element and restrict vertical movement of the element. The tenon and mortice arrangement for guiding the movement of the element 3 could, of course, be replaced by any other suitable means for guiding movement of the element. Rebates or shoulders 8 are formed in the sides of the mould cavity and serve as dead-stops to limit movement of the element 3 as it moves to the first, brick-forming position. Thus the shoulders 8 define the first position.

A cover plate 9 is mounted upon the element 3, the plate 9 being received in a recess formed in the top surface of the element 3 (most clearly illustrated in Figure 5 of the drawings) and in recesses defined by those parts of the mould 1 which separate adjacent mould cavities in the extended region of the mould cavities (see Figure 4). The upper surface of the cover plate 9 lies flush with the top of the mould 1. The cover plate is fixed to and therefore moves with the element 3. When the element 3 is in the first, brick-forming position, the cover plate extends over the space 10 which exists between the element 3 and the end of the mould cavity where it is connected to the hydraulic cylinder 5. The plate serves to prevent raw material, such as concrete which is being introduced into a mould cavity, from entering the space 10 and subsequently preventing movement of the element.

In use the mould 1 is located upon a support

surface in the form of a steel or wooden pallet 11 which may be introduced into a block-forming machine or which form part of such a machine.

The element 3 is moved to the first, brick-forming position and raw material is introduced into the mould cavity. The engagement of the textured surface 4 of the movable element 3 with the material introduced into the mould cavity will form a correspondingly textured or contoured surface on the block or brick being formed. A tamper plate or stripper shoe 12 (see Figure 5) is brought into engagement with the upper surface of the material in the mould cavity and exerts pressure on the material so that the material is compacted or compressed in conventional manner. Once the material forming the block has been compressed or compacted the movable element 3 is moved to the second position so that the surface 4 is disengaged from the block or brick thereby enabling the block to be removed from the mould cavity without destroying the contoured surface which has been formed by the surface 4 of the element 3.

In practice, once the material forming the blocks has been sufficiently compacted or compressed the tamper head or plate is locked in position, the element 3 is moved to the second position and the mould is moved vertically upwardly to leave the blocks on the pallet 11 beneath the tamper head. The tamper head is subsequently removed and the blocks are cured or allowed to set. Some of the material forming the blocks will tend to adhere to the textured surface of the movable element 3 and in order to remove any such deposits from the face 4 a set of brushes 21 are provided on the tamper head 12. There is a brush 21 associated with each movable element 3. The brushes 21 may, for example, be formed of polypropylene, steel or bronze. As

the mould is moved vertically the brushes engage the textured surface of respective elements 3 and remove any deposits of material from the surface.

If, in addition to the face engaged by the surface 4 of the element 3 it is desired to form the upper surface of the block with a textured finish, then a tamper plate or stripper shoe 12 having an appropriately textured surface 13 is pressed into the upper surface of the material in the mould cavity. If it is also desired to form the lower surface of the block with a textured finish then a draw or stripper plate 14 having an appropriately formed upper surface 15 is provided on the pallet 11 with the mould 1 being located upon the plate 14 by way of locating pins 16 formed on the plate, the pins 16 passing into bores formed in the underside of the mould 1 in order to ensure correct alignment. As shown in Figure 5 of the drawings the pins 16 and the bores 17 may be of frustoconical shape. The surface 15 of the plate 14 may be textured over its entire area or may be textured in panels corresponding to the size of the individual mould cavities.

The mould may be used with core-pulling attachments if desired.

It will be appreciated that the mould may be used to form bricks or blocks having one, two or three textured faces. If only one textured face is required on the end of a block then the mould is simply located upon the pallet 11 and that end face is engaged by the movable element 3 to provide the textured finish. A planar tamper plate is used to compact or compress the material. If two textured faces are required, one on the end of the block and the other on the upper or the lower surface of the block then the second textured face is formed either by locating the mould on the textured

stripper plate 14 to form a textured surface at the bottom of the block or alternatively the mould can be located directly upon the pallet 11 and the material forming the block can be engaged from above by a textured tamper plate to form a textured surface at the top of the block. If three textured surfaces are required (at the top, bottom and one end of the block) then both the textured stripper plate 14 and the textured tamper plate 12 are used.

It is only possible to form a block with three textured surfaces by using the movable element 3 to form part of the mould cavity since it would not be possible to remove the block from a cavity having four fixed sides with one of the sides defining a contoured or three-dimensional surface, without destroying the contoured surface formed by that one side of the cavity.

It would, of course, be possible to form bricks or blocks having more than three textured surfaces if a plurality of movable elements 3 were to be provided in each mould cavity.

Figures 6 and 7 illustrate a second design of movable element 3. In this embodiment the element 3 is mounted in the mould cavity 2' for pivotal movement about a hinge pin 18, located adjacent the upper edge of the element above the textured face 4 defined by the element. As with the first design, the movable element 3 is attached to a hydraulic cylinder 5 which serves to move the element between a first, brick-forming position and a second, disengaged position. The element 3 defines an elongate slot 19 within which a pin 20 mounted upon the piston rod of the cylinder 5 is received. The slot 19 is positioned well below the level of the hinge pin 18. Thus linear movement of the piston rod of the cylinder 5 causes the pin to move

within the slot 19 effecting rotation of the element 3 about the hinge pin 18.

The movable element 3 defines a textured face 4 for engaging the material from which the brick or block is formed. At its upper end the element 3 has a rearwardly sloping portion 19 that is to say a portion which is directed towards the end of the mould cavity where the cylinder 5 is located. When the movable element 3 is in the first, brick-forming position, the textured surface 4 is disposed vertically and the upper edge of the element 3 extends rearwardly to engage the end of the mould cavity such that material cannot enter the space which exists between the element and the end of the mould cavity.

The mould having cavities provided with movable elements as shown in Figures 6 and 7 is used in the same manner as described above in relation to the first embodiment. Thus the mould is located upon a pallet 11 and the movable element is moved to the first position by means of the cylinder 5 effecting a clock-wise rotation of the element about the hinge pin 18 until the textured surface 4 is disposed vertically and the upper region of the element engages the end of the mould cavity. Raw material for forming bricks or blocks is then introduced into the mould cavity and is compressed or compacted by the tamper head in conventional manner. When the material is sufficiently compacted or compressed the movable element 3 is moved to the second or disengaged position, as shown in Figure 7, by means of the cylinder 5 effecting an anti-clockwise rotation of the element 3 about the hinge pin 18 until the lower edge of the element 3 engages the end of the mould cavity. It is to be observed that when the element 3 has moved to the second position the previously rearwardly extending portion 19 at the top of the element

now stands substantially vertically but does not lie above the block or brick. Thus it is now possible to remove the block or brick from the mould cavity, as described above. Also as described above, a textured tamper plate 12 and/or a textured draw or stripper plate 14 may be utilised in order to provide the desired number of textured surfaces on the brick or block. Again it will be possible for the mould to be used with a core-pulling attachment.

It is to be appreciated that various modifications may be made to the above proposed designs without departing from the scope of the present invention. Thus, the number of mould cavities and the layout of the mould cavities, as well as the shape and dimensions thereof may be varied. It would be possible to provide a mould where all of the cavities have a movable element, although the arrangement illustrated in Figure 1 enables bricks or blocks having a variety of textured surfaces to be produced.

CLAIMS:

1. A mould for use in forming a concrete block or the like, the mould defining one or more mould cavities for receiving material from which the or each block is to be formed, at least some of the mould cavities incorporating a movable element having a textured or three-dimensional surface, said textured or three-dimensional surface forming one face of the mould cavity, the element being mounted in the mould cavity for movement between a first position in which said textured surface engages material introduced into the cavity to form a textured surface in the material and a second position in which, once the material has been compacted or compressed, the textured surface of the element is disengaged from the material forming the block thereby enabling removal of the block from the mould cavity without damaging the textured surface of the block, means being provided for moving the movable element between said first and second positions.

2. A mould according to Claim 1 wherein the mould defines a plurality of mould cavities.

3. A mould according to Claim 1 or Claim 2 wherein the or each cavity comprises an aperture extending through the mould, the aperture being generally rectangular in plan view.

4. A mould according to Claim 3 wherein the textured or three-dimensional surface of the movable element forms a face along a shorter side of the mould cavity.

5. A mould according to any one of the preceding

Claims wherein said means for moving the movable element comprise a hydraulic cylinder connected to the element.

6. A mould according to any one of Claims 1 to 4 wherein the moving means are mechanical, pneumatic or electrical means.

7. A mould according to any one of the preceding Claims wherein the movable element is mounted for linear movement between the first and second positions within the mould cavity.

8. A mould according to Claim 7 wherein co-operating projections and recesses are provided on the movable element and the sides of the mould cavity to guide the movement of the element.

9. A mould according to Claim 7 or Claim 8 wherein the mould cavity defines a stop to limit movement of the movable element.

10. A mould according to any one of Claims 7 to 9 wherein the movable element is provided with a cover which extends over a space between the element and one end of the mould cavity adjacent which the element is mounted, the cover preventing the ingress of material into that space.

11. A mould according to any one of Claims 1 to 6 wherein the movable element is mounted for pivotal movement between the first and second positions within the mould cavity.

12. A mould according to Claim 11 wherein the element is pivotally mounted on a hinge pin disposed adjacent the upper edge of the element.

13. A mould according to Claim 11 or Claim 12 wherein the upper region of the movable element is so formed as to engage one end of the mould cavity adjacent which it is mounted when in the first position thereby preventing the ingress of material into the space between the remainder of the element and the end of the mould cavity.

14. A brick or block forming machine incorporating a mould in accordance with any one of the preceding Claims.

15. A machine according to Claim 14, the machine incorporating means for removing deposits of material from the textured or three-dimensional surface of the or each movable element.

16. A machine according to Claim 15 wherein said removing means comprise a brush mounted on a tamper head of the machine.

17. A mould substantially as herein described with reference to and as shown in Figures 1 to 5 of the accompanying drawings.

18. A mould substantially as herein described with reference to and as shown in Figures 1, 6 and 7 of the accompanying drawings.

19. Any novel feature or combination of features disclosed herein.